

STANDARD**Grades 3–5: Measurement**
I. Understand measurable attributes of objects and the units, systems, and processes of measurement.**EXPECTATION****A. Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute.**

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| 1. Use a variety of objects to measure length (e.g., width, height, perimeter), volume, weight/mass, and area (e.g., cubes, grid, paper, string, squares). | 1. Apply counting procedures to estimate measurements of length, area, volume, and weight/mass. | *1. Using models, investigate and describe the measure of circumference of a circle as length. |
| *2. Compare the size of a given angle with a right angle (<i>greater than</i> , <i>less than</i> , or <i>equal to</i>) and classify as obtuse, acute, or right. | *2. Investigate and compare angle measures using models and manipulatives with angles of measure 45 degrees, 90 degrees, and 180 degrees. | 2. Identify, describe, and draw right, acute, and obtuse angles. |
| | *3. Using models, find the area of geometric shapes. | 3. Using models, create examples of polygons with a given area and explain. |
| *3. Develop strategies and determine perimeters of polygons. | | *4. Using models, create examples of right prisms with a given volume and explain. |
| 4. Select appropriate units of measurement—length, weight/mass, and time—and explain the basis for the selection. | 4. Select units appropriate for the attributes being measured (length and area) and explain the basis for the selection. | 5. Select units appropriate for the attributes being measured (length, area, and volume) and explain the basis for the selection. |

EXPECTATION

B. Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems.

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| 1. Explain the need for measuring with standard units. *2. Use metric and U.S. customary units to measure length (inches, feet, yards, centimeters, and meters), liquid volume (cups, pints, quarts, gallons, and liters), temperature (degrees Fahrenheit, degrees Celsius), and weight/mass (ounces, pounds, grams, and kilograms). | | |
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EXPECTATION

C. Carry out simple unit conversions, such as from centimeters to meters, within a system of measurement.

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| | *1. Convert units of measure within the metric system: length (centimeters, meters, kilometers), mass (grams, kilograms), and capacity (milliliters, liters); and within the customary system: length (inches, feet, yards), weight (ounces, pounds), and liquid volume (cups, pints, quarts, gallons). | |
| | 2. Convert units of time including days, hours, minutes, and seconds. | |

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| EXPECTATION | D. Understand that measurements are approximations and understand how differences in units affect precision. | <table border="1" data-bbox="306 168 518 1934"> <tr> <td data-bbox="306 168 409 1934">3</td><td data-bbox="409 168 518 1934">4</td><td data-bbox="518 168 518 1934">5</td></tr> <tr> <td></td><td></td><td data-bbox="518 168 518 1934"> 1. Describe factors that affect precision such as the limitations of the measuring tool, the scale on the measuring instrument, and the need for accuracy. </td></tr> </table> | 3 | 4 | 5 | | | 1. Describe factors that affect precision such as the limitations of the measuring tool, the scale on the measuring instrument, and the need for accuracy. | | | |
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| | | 1. Describe factors that affect precision such as the limitations of the measuring tool, the scale on the measuring instrument, and the need for accuracy. | | | | | | | | | |
| EXPECTATION | E. Explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way. | <table border="1" data-bbox="579 168 962 1934"> <tr> <td data-bbox="579 168 682 1934">3</td><td data-bbox="682 168 791 1934">4</td><td data-bbox="791 168 962 1934">5</td></tr> <tr> <td></td><td></td><td data-bbox="962 168 962 1934"> 1. Compare changes in area and changes in total perimeter when shapes are combined or subdivided. </td></tr> <tr> <td></td><td></td><td data-bbox="962 168 962 1934"> 2. Construct models to demonstrate the effect of holding one variable constant while changing the value of another variable such as building rectangles with varying perimeters and constant areas. </td></tr> </table> | 3 | 4 | 5 | | | 1. Compare changes in area and changes in total perimeter when shapes are combined or subdivided. | | | 2. Construct models to demonstrate the effect of holding one variable constant while changing the value of another variable such as building rectangles with varying perimeters and constant areas. |
| 3 | 4 | 5 | | | | | | | | | |
| | | 1. Compare changes in area and changes in total perimeter when shapes are combined or subdivided. | | | | | | | | | |
| | | 2. Construct models to demonstrate the effect of holding one variable constant while changing the value of another variable such as building rectangles with varying perimeters and constant areas. | | | | | | | | | |

STANDARD II. Apply appropriate techniques, tools, and formulas to determine measurements.

EXPECTATION A. Develop strategies for estimating the perimeters, areas, and volumes of irregular shapes.

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| | 1. Develop and describe strategies for estimating the area and perimeter of irregular shapes using manipulatives (e.g., geoboards, square tiles, graphic representations). | 1. Compare and evaluate different strategies for estimating area and perimeter of irregular shapes. |
| | | 2. Develop and describe strategies for estimating volumes of irregular shapes. |

EXPECTATION**B. Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles.**

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| 1. Determine an appropriate measurement unit to measure time, length, weight, and volume (e.g., student chooses centimeters instead of meters to measure a pencil). *2. Select and use an appropriate tool to measure time (minutes or larger), length (centimeters, meters, inches, feet, yards), mass/weight (grams, kilograms, ounces, pounds), and liquid volume (cups and fractional parts, liters and fractional parts). | 1. Estimate the distance to objects or places and determine the amounts of various units of time (minutes, hours, days, weeks, etc.) it will take to reach these objects or places. *2. Select and use an appropriate tool to measure liquid volume including pints and quarts. | *1. Select and use appropriate tools and units to measure given items to an indicated precision (time in seconds through years; length in millimeters through kilometers, one-eighth of an inch through miles; liquid volume in milliliters through liters, ounces through gallons; mass/weight in milligrams through kilograms, ounces through pounds). *2. Determine an amount of elapsed time in hours, minutes, and seconds within a 24-hour period. |
| | 3. Determine the amount of elapsed time in hours and minutes within a twelve-hour period. *4. Using analog and digital clocks, tell time to the nearest minute and to the nearest five-minute interval, including use of A.M. and P.M. | *2. Determine an amount of elapsed time in hours, minutes, and seconds within a 24-hour period. *3. Using a protractor, measure angles between 0 and 180 degrees inclusive. |
| 3. Read temperature to the nearest degree from a Celsius thermometer and from a Fahrenheit thermometer. 4. Estimate the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F , water boils at 100°C and 212°F , and normal body temperature is about 37°C and 98.6°F). | 5. Determine temperature changes during time intervals from a Celsius thermometer and a Fahrenheit thermometer. | |

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| EXPECTATION | C. | Select and use benchmarks to estimate measurements. | |
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| | | 1. Develop a sense for measurement by using appropriate benchmarks (e.g., the distance from the elbow to the index finger is about a foot, a paper clip is about a gram). | |
| EXPECTATION | D. | Develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms. | |
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| | | 1. Use concrete and graphic models to find areas of common two-dimensional shapes. | *1. Use concrete and graphic models to discover formulas for finding the area of common two-dimensional shapes. |
| | | | *2. Describe and determine the area of rectangles and related triangles and parallelograms. |
| EXPECTATION | E. | Develop strategies to determine the surface areas and volumes of rectangular solids. | |
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| | | | *1. Using models, develop and describe strategies for determining the volume and surface area of rectangular solids. |